# Navy Personnel Research and Development Center

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## Literature Review on Concurrent Dual Career Development in the URL

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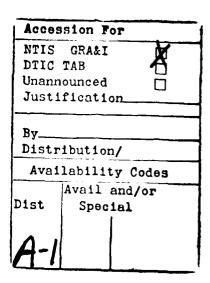
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| Accession For | | |
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## REPORT DOCUMENTATION PAGE

| 1a. REPORT SECURITY CLASSIFICATION<br>UNCLASSIFIED | 1b. RESTRICTIVE MARKINGS |
|---|---|
| 2a. SECURITY CLASSIFICATION AUTHORITY | 3 DISTRIBUTION / AVAILABILITY OF REPORT<br>Approved for public release; distribution is unlimited. |
| 2b. DECLASSIFICATION / DOWNGRADING SCHEDULE | |

| 4 PERFORMING ORGANIZATION REPORT NUMBER(S)<br>NPRDC TN 89-20 | 5. MONITORING ORGANIZATION REPORT NUMBER(S)<br>TCN 87-412 (Delivery Order 0549) |
|---|---|

| 6a. NAME OF PERFORMING ORGANIZATION<br>Jeanette N. Cleveland | 6b OFFICE SYMBOL<br>(If applicable) | 7a. NAME OF MONITORING ORGANIZATION<br>U.S. Army Research Office |
|---|---|---|

| 6c ADDRESS (City, State, and ZIP Code)<br>Colorado State University<br>Fort Collins, CO 80523 | 7b. ADDRESS (City, State, and ZIP Code)<br>P.O. Box 12211<br>Research Triangle Park, NC 27709-2211 |
|---|---|

| 8a. NAME OF FUNDING / SPONSORING ORGANIZATION<br>Navy Personnel Research and Development Center | 8b. OFFICE SYMBOL<br>(If applicable)<br>Code 212 | 9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER |
|---|---|---|

8c. ADDRESS (City, State, and ZIP Code)
Dr. Robert Morrison
Contract Support Office
San Diego, CA 92152-6800

10 SOURCE OF FUNDING NUMBERS

| PROGRAM ELEMENT NO | PROJECT NO | TASK NO | WORK UNIT ACCESSION NO |
|---|---|---|---|
| | | | |

11 TITLE (Include Security Classification)
Literature Review on Concurrent Dual Career Development in the URL

12 PERSONAL AUTHOR(S)
Jeanette N. Cleveland

| 13a. TYPE OF REPORT<br>Final | 13b TIME COVERED<br>FROM Jul 87 TO Dec 87 | 14 DATE OF REPORT (Year, Month, Day)<br>1989 June | 15 PAGE COUNT<br>43 |
|---|---|---|---|

16 SUPPLEMENTARY NOTATION

| 17 COSATI CODES | | | 18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number) |
|---|---|---|---|
| FIELD | GROUP | SUB-GROUP | Dual career management, simultaneous skill development, job transfer, experiential learning, human resource planning |
| 05 | 09 | | |
| | | | |

19 ABSTRACT (Continue on reverse if necessary and identify by block number)
→ The development of members of the unrestricted line (URL) community as potential materiel professionals (MP) is extremely vital to the Navy because of the operational experience that these officers can bring to the MP positions. However, few junior officers have developed their MP abilities in the past. The Navy currently has not developed policies to aid the URL officer in the simultaneous development of two partially related skills. Therefore, there is a need to develop a framework for understanding and identifying the parameters involved in the effective design and administration of policy for URL officers in concurrent development of dual careers. The first objective of the contract is reported here. The first primary objective of the contract was to review and integrate available research and practice on dual career ladders. The outcome of this review identifies 10 career areas that contribute to the development and management of dual or multiple career ladders. The primary conclusion was that there is a need to develop an integrated human resource system that will support both the operational needs of the URL and the managerial/technical needs of the MP community.

| 20. DISTRIBUTION / AVAILABILITY OF ABSTRACT<br>☒ UNCLASSIFIED/UNLIMITED  ☐ SAME AS RPT.  ☐ DTIC USERS | 21 ABSTRACT SECURITY CLASSIFICATION<br>UNCLASSIFIED |
|---|---|
| 22a NAME OF RESPONSIBLE INDIVIDUAL<br>Robert F. Morrison | 22b. TELEPHONE (Include Area Code)<br>(619) 553-9256  22c. OFFICE SYMBOL<br>Code 62 |

DD FORM 1473, 84 MAR
83 APR edition may be used until exhausted
All other editions are obsolete.

# FOREWORD

This report reviews the literature to identify possible components of integrated human resource management systems, especially those involved in effective multi-career path management as represented in the development of unrestricted line (URL) officers as materiel professional (MP) officers. The MP community requires input from the operational, URL officer, communities to make the acquisition of new weapons systems responsive to operational needs. Therefore, URL officers need to acquire the knowledge, skill, and ability necessary to serve at the senior grade level as an MP while they are URL officers, primarily when assigned to shore billets. The rotation between sea (URL) and shore (MP-related) careers during the first 15 to 20 years in the Navy is the focus of this report.

This is the first of two reports conducted under TCN 87-412; the contracting officer's technical representative for the work was Robert F. Morrison. This task was conducted within exploratory development (Program Element 62763N/62233N) under work unit number 1487WR4B424, MP Officer Careers, sponsored by the Office of Naval Technology (OCNR 22). A third report completed at the Navy Personnel Research and Development Center under the above work unit described the MP officers' impressions of the first 2 years of the MP program and the differences between URL officers that transferred to the MP program and those that chose not to do so. The report is intended for the use of the materiel professional officer community manager (OP-130E19) and materiel professional personnel policy (OP-13M).

John J. Pass
Director, Personnel Systems Department

Prior MP Officer Careers Publications:

1. Morrison, R. F., & Brantner, T.M. (1989, March). Unrestricted line officers and the materiel professional career (NPRDC TN89-12). San Diego, CA: Navy Personnel Research and Development Center.

2. Cleveland, J.N. (1989, March). Management of concurrent dual career development: Military and industry findings and research approach (NPRDC TN89-13). San Diego, CA: Navy Personnel Research and Development Center.

# SUMMARY

## Problem

The new (1985) materiel professional (MP) community was designed to improve the Navy's management and acquisition of weapons and materials. The development of some unrestricted line (URL) officers as potential MPs is critical because of the operational experience they can provide. Currently, however, a number of Navy practices inhibits the technical development of officers for future transition from the URL to the MP community. Therefore, a less than optimal number of junior officers currently have developed their technical and managerial skills along with their operational skills.

## Purpose

The purpose of the research is to develop an approach that will identify the problem domain and the relevant factors and systems involved in the management of concurrent multi-career paths. The literature review described in this report is one step in achieving this objective.

## Approach

Three overlapping methods were used to ensure thorough coverage of the literature. First, four research team members independently generated key words or phrases relevant to the problem statement and objectives. Research and trade journals from approximately 1978 to 1987 were reviewed using these terms. Second, two computerized literature searches were conducted to supplement step one. Third, experts in career management and human resource planning were identified and interviewed on issues pertaining to the project's objectives.

## Findings

Ten topic areas were identified through the literature search as central issues concerning concurrent dual career development. The topics are (1) Human Resource Planning, (2) Career Development Systems, (3) Multiple Career Paths in Organizations, (4) Skills Required for Management, (5) Predicting Career Success, (6) Skill Requirements of Jobs, (7) Formal Training, (8) Skill Development through Job Transfers, (9) Experimental Learning, and (10) Mastery Learning. Themes and critical points emerging from the literature are identified within each topic.

## Conclusions

Although there is substantial literature on each of the 10 topics, there is little direction provided for designing Human Resource Systems so that various components are coordinated in terms of goals. The literature often provides little empirical verification for claims regarding specific organizational practices. Further, although there is literature discussing dual career ladders, this literature does not integrate this practice into the larger framework of human resource planning. Therefore, the existing literature does not provide a clear indication of how to establish and manage effectively multiple career paths as part of an integrated Human Resource System.

## Recommendations

Organizations and other military services with multiple career paths should be identified and interviewed in order to obtain information on the factors relevant to managing multiple career ladders. A model should be developed that will provide guidance in the development and management of a multi-career ladder system. Current Navy practices and information on office billets and training programs should be integrated within such a model in order to guide systematic research in this area.

# CONTENTS

# INTRODUCTION

## Problem Statement

In 1985, at the direction of the Secretary of the Navy, the Navy introduced a new officer community called materiel professional (MP). The new community was designed to improve the Navy's management of weapons and materials acquisition by integrating officers with highly developed technical expertise into the process. Because of the operational experience that the unrestricted line (URL) officers can provide, the development of URL officers as potential MPs is critical to the Navy. However, a number of current Navy practices inhibits the development of URL officers for future transition into the MP designator. First, URL officers enter into this new community late in their careers. For the first 18 to 20 years, the URL officers are primarily operational officers. As such, most are developing skills that will prepare them as a member of a warfare specialty such as aviation, surface, or submarine. Therefore, the URL officers, as a whole, have less time to devote to developing technical skills and knowledge. Second, the rewards that URL officers achieve during those first 18 to 20 years are primarily based on their achievements in their warfare or operational specialties (see Bjerke, Cleveland, Morrison, & Wilson, 1987) rather than on the development of their acquisition knowledge. Third, MP-related abilities that are developed are implicitly viewed as secondary. Rewards associated with the development of these technical skills in the URL and the primary use of the skills are typically deferred until officers reach the grade of O-6. Thus, within the URL, a less than optimal number of junior officers have developed simultaneously their MP abilities along with their warfare specialty.

## Objective

Currently, the Navy has not systematically developed policies to assist the URL officers in developing simultaneously two partially related sets of occupational skills (operational and technical). There is a need to develop an approach that will define the problem domain and identify the relevant factors, processes, and systems in the development of concurrent career paths and guide the strategic planning efforts for the design of dual career paths within the URL. One step in achieving this objective is to review and integrate available research and practice that may be relevant to the design and management of simultaneous progress on dual career ladders.

# APPROACH

In order to identify and review the literature on the relevant factors involved in concurrent dual career development, three overlapping methods were employed to ensure thorough coverage. First, four members of the research team independently generated key words or phrases relevant to the problem statement and objectives. Redundant words or phrases were eliminated. The remaining key words/phrases were used as a basis for a traditional literature review on current research and practices. Key words/phrases included manpower planning, human resource planning, succession planning, career management, career development, dual career ladders, dual career paths, multiple career patterns, job and task inventories, skills assessment, role analysis, skill acquisition, skill maintenance, skill decay, skill retention, skills required for technical and R&D, skills required for management, adult training, adult education, job learning, job rotation, job mobility, experiential learning, and learning via job experience. Journals and texts from 1978 to the present were reviewed using the above terms. The journals surveyed included Academy of Management Journal, Academy of Management Review, Administrative

Management, Administrative Management, Administrative Science Quarterly, Adult Education, Behavioral Science, Career Development Quarterly, Career Development Review, Ergonomics, Harvard Business Review, Human Resource Planning, IEEE (Engineering Management), Journal of Applied Behavioral Science, Journal of Applied Psychology, Journal of Business Education, Journal of Career Planning and Employment, Journal of Educational Psychology, Journal of Education Research, Journal of Human Resources, Journal of Learning Skills, Journal of Management in Engineering, Journal of Memory and Learning, Journal of Occupational Psychology, Journal of Vocational Behavior, Personnel, Personnel Administration, Personnel Administrator, Personnel Journal, Personnel Management, Personnel Psychology, Research Management, Review of Education Research, Sloan Management Review, Training and Development Journal, and Vocational Research Quarterly.

The second step used in the literature search was to conduct two computerized literature searches. The first computerized search accessed the psychology and business data banks. Key terms used in this search were designed to obtain recent references on management and technical skills and skill development. The second computerized search accessed the technical and engineering literatures. Key terms used in the engineering literature search were designed to obtain current information on dual career ladders, especially the technical and managerial ladders in organizations. The computerized searches were intended to supplement our traditional literature review technique.

The third step in the literature review process was taken to (1) assess the adequacy of literature coverage (in terms of key terms and concept) and (2) to obtain material that was not currently in published form. In step three, key career and human resource planning experts were identified and interviewed on issues relevant to the project's objectives.

Although there were redundancies among the steps, new information and references were gathered using the three overlapping strategies. There was one source of information that, given the time constraints of the project, was not adequately accessed. Few technical reports from the military are included in this literature review. Therefore, the reader should be aware of this limitation while reading the review and the conclusions.


## FINDINGS

Ten general, yet partially overlapping topic areas were identified through the literature search as relevant to the issues concerning successful concurrent dual career development. The 10 topics named in the review range from the more general considerations to the more specific issues involved in career development and management. They are (1) Human Resource Planning, (2) Career Development Systems, (3) Multiple Career Paths in Organizations, (4) Skills Required for Management, (5) Predicting Career Success, (6) Skill Requirements of Jobs, (7) Formal Training, (8) Skill Development through Job Transfers, (9) Experiential Learning, and (10) Mastery Learning. Each of the topics is introduced and key themes emerging from the literature are identified within the topic.

Concurrent dual career development, although involving many issues itself, is part of a larger system. The first three sections of the literature review are designed to describe the general framework of the human resource planning process, the Career Development processes within organizations and general issues concerned with career patterns within organizations. The problems or parameters of concurrent development may be viewed as

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a special, more complex case of human resource planning, career development and career patterns.

As part of the human resource planning process, a number of factors emerge as clearly important in the successful development of employees in either a single career path or in a multiple career path organization. First, an organization must define success in targeted positions. Since frequently, the targeted positions include management positions, section four reviews the literature concerning the skills required for management and the skills necessary for moving from more technically-oriented positions to managerial jobs. In section five, predicting career success, a distinction is made between identifying the skills necessary to succeed in management and identifying the techniques or predictors of career success including personality tests, peer nomination, and the assessment center. The human resource literature frequently cites the need to inventory the skills needed for key jobs. In section six, the literature on assessing the skill requirements of jobs is reviewed including the most common methods for establishing skill requirements. The last four sections included in the literature review concern four key parameters in career development; especially the concurrent dual career development-acquisition of skills, knowledge, and abilities. In the section on training, formal training techniques are discussed. Further, issues concerning the transfer of training including skill retention are briefly reviewed. Next, the job transfer/job rotation literature is reviewed as another method for skill development. Skill development through either formal training techniques or through rotation frequently involves considerations in basic learning processes including experiential learning and mastery learning. In order to assess the extent to which skills are developed, brief reviews of the experiential learning and mastery learning literature are presented.

## Military Leadership, Civilian Manager, and Technical Manager: Clarification of Terms in Reference to U.S. Navy

The term manager in this report refers to those behaviors, skills, and activities associated with nonmilitary leadership or private industry managers rather than the leadership that is reflected or required in the URL operational billets. Both in the Navy and in the research literature (VanFleet & Yukl, 1986), there is a recognition that military (operational) and nonmilitary (shore) leaders or managers may differ in requisite skills and goals. Therefore, it is important to keep in mind that the review largely concerns private industry managerial behaviors.

A review of the literature is clearly relevant to the Navy. First, many of the requisite skills of managerial success in industry are similar to those necessary for successful performance in shore assignments in the URL. That is, many of the shore assignments, especially those associated with the weapons system acquisition management (WSAM) community, are designed to develop both managerial and technical skills similar to those found in private industry. Second, the issues and problems encountered in industry concerning the management of technical (i.e., engineering) and managerial ladders are analogous to the relationship between the operational (i.e., military leader) and nonoperational (i.e., civilian managerial and technical) career "ladders" in the URL. Therefore, it is useful to explore such issues as how to attract qualified officers (employees) into nontraditional career paths and how to coordinate the reward system of the organization with the goals of the career ladders.

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## Human Resource Planning

The term human resource planning has a variety of meanings, but usually refers to some integrated system for anticipating and filling human resource needs, particularly at the managerial level. Activities involved in human resource planning typically include:

1. Goals assessment--determining what goals the organization wishes to achieve over some reasonably long time frame. This is where human resource planning often comes into contact with strategic business planning.

2. Human resource needs assessment--determining the number and type of personnel needed to carry out specific functions.

3. Manpower forecasting--predicting, on the basis of current personnel, what sorts of recruitment, selection, transfers, etc. will be needed to meet needs identified in #2. This is where you most often encounter sophisticated mathematical forecasting techniques (Dill, Gauer, & Weber, 1966).

4. Formation of individual career plans--sometimes done systematically, sometimes only for high-potential individuals.

5. Integration of individual and organizational needs--often done by committees, especially where high-potential individuals are concerned. The human resource literature is generally vague about the exact methods used in this process.

6. Implementation--literature in this area is often concerned with the mechanics of maintaining human resource data bases or human resource information systems. This aspect of human resource planning is discussed at length by Cascio and Awad (1981).

Human resource planning, human resource management, and manpower planning are often treated as synonymous (Kahalas, Payer, Hoagland, & Levitt, 1980). Where a distinction is made, manpower planning is more likely than human resource planning to focus on statistical forecasting, computer simulation and the filling of lower-level jobs. Human resource planning often contains a significant focus on managerial jobs, especially on top management succession (Carnazza, Ference, Korman, & Stoner, 1981). By implication, the time frame for human resource planning os often longer (e.g., 10 to 20 years) for managerial positions than for manpower planning in blue and pink collar jobs.

Much of the human resource planning literature is devoted to descriptions, in fairly general terms, of the human resource system at one particular company. These descriptions rarely include operational details (e.g., cost, number of people involved, method of job analysis, statistical forecasting used), but rather focus on the structural features of the human resource system, such as the number of committees involved or the relative responsibilities of different departments and committees for human resource planning activities. Examples of articles describing human resource systems in government agencies as well as private sector organizations (e.g., Sun Company, Weyerhauser, IBM, Bell System, Corning, Crocker Bank) are presented in Ackerman (1979), Buller and Maki (1981), Cashel (1978), Dyer and Heyer (1984), Dyer, Shafer, and Regan (1982) Ettelstein and Jackson (1978), Hercus (1979), Houk (1981), Lavin (1981), Lictenberg and Ettelstein (1982), Niehaus (1980), Reypert (1981), and Wellington (1981).

Some form of human resource planning is practiced by most organizations, although it is often restricted to managerial jobs (Greer & Armstrong, 1980). Kahalas et al. (1980)

suggest that the widespread use of human resource planning systems is motivated by the perceived scarcity of managerial talent. Organizations generally prefer to develop their own managers rather than to recruit them from outside sources, and systematic long-term planning is seen as necessary to maintain a constant supply of individuals who are prepared to take ov r top management positions.

Human resource planning systems are generally more detailed, more sophisticated, and more clearly tailored to the individual the higher one moves up in the corporate hierarchy (Alpander & Botter, 1981; Glickman, Hahn, Fleishman, & Baxter, 1968; Kelleher & Cotter, 1982; Newman & Krzystofiak, 1978). Thus, human resource planning for secretarial employees might be accomplished with a brochure, whereas high-potential managers receive detailed, individual attention from their supervisors. Systematic human resource planning is more frequent for managerial than for technical employees, even when they are at equivalent levels in the organization (e.g., first-line manager vs. junior engineer) (Alpander & Botter, 1981).

Human resource plans for managers often involve substantial time spans (e.g., 10 to 20 years). This time frame reflects the widespread (but empirically unverified) belief that successful performance in top management requires extensive experience in several different jobs, locations, and divisions (Bolt, 1982). The human resource planning literature does not suggest that this sort of job rotation is necessary solely to achieve an understanding of the organization. Rather, there is a widespread (but again unverified) assumption that rotation through several different jobs develops skills, abilities, and knowledge needed for success in top management (Vetter, 1967). Skill development through job transfer is discussed in a later section. Job rotation is also seen as a powerful method of socializing the manager (Edstrom & Galbraith, 1977).

Skill evaluation is a critical part of the human resource planning (Dyer, Shafer, & Regan, 1982). This term refers both to the skills that are present in the workforce and to the skills that are required by, or are developed by different jobs in the organization (Reymeise, 1982). For example, Weihrich (1980) suggests that human resource planning should include a "management inventory" of the skills that are now available, or will soon become available in the managerial workforce. Lopez (1970) discusses the development of "talent pools" that have a similar objective. Finally, Kaumeyer (1979) discusses computerized skill inventories. A common feature of human resource systems is consideration of whether individuals are in jobs that will develop skills needed to meet their long-term goals (Ackerman, 1979).

It is clear from the human resource planning literature that skill evaluations are typically done on an informal basis (Dyer, Shafer, & Regan, 1982), and that the application of systematic procedures such as job analysis and management testing is rare. Reymeise (1982) identifies skill analysis (including research on job analysis, job families, and career paths) as the central process in and the basis for all human resource activities. Although this aspect of human resource planning is a highly critical one, there is little evidence that human resource planners have developed valid procedures for evaluating the skill requirements of jobs, the skills that are actually developed in different jobs, or the skills that are present in the managerial workforce.

Walker and Armes (1979) identify a series of management organizational shifts necessary for effective human resource or succession planning. The shifts include changes in responsibility for planning, the evaluation of performance, career progression, and development activities. Bolt (1982) maintains that extensive management involvement is a critical element of effective human resource planning.

## Summary

Human resource planning is practiced in some form by most organizations although often it is targeted for managerial jobs. One critical element of human resource planning is skill evaluation, which is typically done on an informal basis. Although this aspect of human resource planning (skill and job analysis) is critical, there is little evidence that human resource planners have developed valid procedures for evaluating the skill requirements of jobs, the skills that are actually developed in different jobs, or the skills that are present in the managerial workforce.

## Career Development

Career development is one component of the more general human resource planning process. Since the simultaneous development of multiple career skills is a special consideration within career development, a general description of the career development literature is presented. Career development refers to activities, mainly on the part of the organization, that are designed to prepare managers (and sometimes supervisors) for positions at higher levels in the organization. Career development involves both the identification of positions that might be appropriate for individuals at some future point and structuring activities that will prepare the individual for that position.

There is a substantial body of literature describing career development activities in various corporations and government agencies, although as was the case with literature describing human resource planning systems, these descriptions tend to be general and vague, presenting few operational details. Descriptions of career development activities at Sears, 3M, GE, General Foods, Xerox, Phillips Petroleum, Citibank, and several government agencies are presented by Burnett (1985), Hall and Associates (1986), Hanson (1981), Kaye (1982), Moore (1979), Scheiber (1979), Starcevich and Sykes (1980), Walker and Gutteridge (1979), and Wellbank, Hall, Morgan, and Hamner (1978).

An integrated model of a career-oriented human resource system is presented by Von Glinow, Driver, Brousseau, Digman, and Prince (1983). This system includes activities ranging from forecasting and strategic planning to recruitment, job design, and performance appraisal. Literature focussing on career development systems per se lists a variety of individual activities, counselor-client activities, activities carried out by the boss, and group activities that can be components of career development systems (Bowen & Hall, 1977). These include the establishment of career information systems, career counseling programs, human resource planning systems, and special concern groups (e.g., for out placement, pre-retirement counseling, minority counseling) (Hall & Associates, 1986; Hall, Hall, & Hinton, 1978; Morgan, Hall, & Martier, 1979). Also mentioned are career fairs, future forums, and videotape programs (Leibowitz, Farren, & Kaye, 1986), as well as the use of mentors in career development (Hunt & Michael, 1983).

Career development programs vary in both their structure and content as a function of the size of the organization and the level of management involved (Digman, 1978). In general, programs involving top management succession in large organizations are the most elaborate. There is a greater need for systematic career development in highly diversified organizations (e.g., those with several distinct product lines) than in homogeneous ones (Walker & Armes, 1979). The Round Table on Career Development in European Enterprises (1975) sponsored a symposium discussing international efforts at career development. Since many European corporations are both multinational and diversified, this symposium is of particular interest.

Although career development is generally thought of as an organizational activity, Bartells, Corballis, Gray, Lissy, McAlindon, Reid, Shaw, and Woodruff (1978) discuss the need for both individuals and organizations to take responsibility for career development; the distinction between career planning and career management made in another section of this report is relevant to their argument. Career development should consider the effects of job changes on both work and nonwork roles (Greenhaus & Kopelman, 1981). Gould and Penley (1984) discuss individual career strategies that should be considered by organizations that attempt to implement career development systems. Career development will not succeed if the individuals' plans are completely at variance with those of the organization. Schein's (1975) concept of career anchors is useful for understanding individual career strategies. Anchors are basic features of all jobs that can be considered as sources of motivation or reward. Schein (1975) has identified five anchors that are present to varying degrees in most managerial jobs: (1) management competence, (2) technical competence, (3) security, (4) creativity, and (5) autonomy and independence. Although the opportunity to exercise these competencies or experience these end states are likely to be valued by all managers, managers are also likely to differ in the relative value they attach to different anchors. Managers are most likely to be satisfied in jobs in which anchors that are important to them are present.

## Career Development Models for Research

The most widely used models in research on career development are descriptive rather than prescriptive. For example, Markov-type models are often used to study the probability of moving from position A to positions B, C, and D in an organization (Charnes, Cooper, Lewis, & Niehaus, 1978; Gordon & Meredith, 1982). Field and Giles (1980) provide an interesting adaptation of the Owens and Schoenfeldt (1979) developmental-integrative model for studying life history data (i.e., biodata). They discuss methods of linking life history groups (clusters of individuals with similar careers). Although more sophisticated than simple Markov analyses, this approach is still descriptive in that it does not specify any theoretical rationale for why some groups are linked and others are not.

Schein's (1975) career anchors could provide a basis for a prescriptive theory of career development. It might be possible to classify jobs in terms of the career anchors they provide rather than in term of the tasks performed, and to construct career paths based on these anchors. Pietrofesa and Splete (1975) discuss psychological research on career development that includes considerations of need theories, social influences, self-concept, and decision making that could form the basis for a psychological theory of development. Finally, the VonGlinow et al. (1983) model could be used to structure research on career development.

One common theme throughout the career development literature is the need to recognize that individuals develop through life stages. Further, the interests and values of individuals may vary depending upon the life stage. Therefore, in career planning it is necessary to consider at what stage the employee is operating.

## Summary

There is a substantial body of literature describing career development activities in organizations although these descriptions tend to be general and vague. The literature focussing on career development systems tend to list a variety of individual activities, counselor-client activities, activities carried out by the boss, and group activities that can be components of career development systems. The links between career development

and other personnel systems are not clear and are largely supported through anecdotal evidence.

## Career Patterns and Multiple Paths

Distinctions are made in the literature between career planning, career management, and career patterns. Career planning and management are activities carried out by the individual and the organization, respectively (Gutteridge, 1978). They both reflect a set of carefully considered decisions that are designed to maximize individually and organizationally valued outcomes. Hall and Hall (1976) claim that a carefully sequenced set of job assignments can have more impact on a manager's development than any other method of training.

Career patterns are outcomes rather than processes (Crites, 1969). Thus, career patterns may emerge as a result of decisions by the individual or the organization, through historical patterns of promotion, as a result of different levels of prestige associated with jobs at the same level in an organization, or as the result of forces in the organizations environment (Burack & Mathys, 1980). An analytic model for measuring career paths is presented in Burack (1972).

Burack and Mathys (1980) distinguish between the traditional career path, which is based on historical patterns of career movement; the career ladder, which represents a hierarchically organized set of jobs that involve common knowledge, skills, and abilities; and the career lattice (or network) that consists of horizontal, lateral, and diagonal career paths. Lateral career paths involve a change of function, whereas diagonal career paths involve a change of both function and level in the organization. Scholl (1983) outlines structural features of career paths. These include (1) height--organizational level of the position at the top of the path, (2) length--number of levels between the top and bottom of the path, (3) position ratio--ratio of positions at a higher level in incumbents at a lower level, (4) transit time--average time in position, and (5) upward mobility opportunity--proportion promoted over a given span of time.

Although career planning is widely advocated, Louis (1982) notes that such planning is sometimes done prematurely. That is, young managers may not have clearly developed interests or skills at the early stages of their careers. Detailed career plans that restrict such managers into one specific track may not be optimal.

### Multiple Paths

Career paths for technical workers present a special problem in organizations. Upward movement in organizations almost invariably means moving from the role of a specialist to that of a general manager. Technical workers, such as engineers, have few opportunities to develop managerial skills early in their careers, and often retain a greater interest in the technical than in the managerial sides of their jobs when they move into management. The best engineers can become mediocre managers (Steiner & Farr, 1986; Tetta, 1987). Organizations have tried to deal with the problems encountered by technical personnel through the development of multiple career paths.

Dual career paths are not only used for engineers, they are also encountered in police work (Bratcher & Gaisor, 1982; Gaisor, 1984); although dual ladders involve extra costs in terms of training, pay, and benefits, they are still viewed as worthwhile (Danforth & Alden, 1983).

Brown and Hoffman (1982) describe five career tracks that have been developed for technical personnel at Alcoa: (1) business management, (2) operations management, (3) technical management, (4) technical application, and (5) technical development. Johnson (1986) describes a similar program at 3M. Although the use of multiple paths helps to solve some of the problems of technical personnel, they are not a full solution. Although dual ladders made it possible for mature engineers to stay involved in technical work, they also tend to formalize the powerless position of the technical staff (Goldberg & Shenhav, 1984). Even when the pay and benefits of parallel jobs in different tracks are equivalent, the general management track has more status and greater opportunities for promotion than is true for technically-oriented tracks (Schoner & Harrel, 1965). This becomes more apparent the higher one moves in the organization; it is often impossible to move into top management from career paths other than those in the general management track (Brown & Hoffman, 1982). Kopelman (1977) has examined the motivational consequences of limited mobility in technical careers.

Burack and Mathys (1980) identify a common set of activities in the development of career ladders. Similar to the activities of an effective human resource planning process, a critical activity is an established organizational policy and support for career planning activities. Further, programs must have credibility with employees (Sacco & Knopka, 1983) and require a high profile through publicity both in-house and outside. Meisel (1977) warns that the professional or technical ladder in a dual path organization must not be used as a dumping ground for failed managers. Employees occupying positions in the technical ladders must learn their position through proven accomplishments. According to H. G. Bryce at 3M:

> A dual ladder is only as good as it is perceived to be. Consequently, make certain that only first class people get on it and that those who are on it continue to do first class work. Should they cease performing, you must have some mechanism for moving them off in order not to tarnish its image. Nothing will destroy a ladder faster. (in Wolff, 1979)

## Summary

The literature distinguishes between a career pattern or path (based on historical patterns of movement or promotion) and a career ladder (which represents a hierarchically organized set of jobs that involve common knowledge, skills, and abilities). Further, career moves that are widely advocated are sometimes done prematurely. The issues concerning dual ladders, the technical scientific vs. the managerial ladder, were discussed. Although dual ladders address some problems associated with technical personnel, they also tend to formalize the powerless position of the technical staff. The technical/scientific should not be used as a "dumping ground" for failed managers.

## Skills Required for Management

One preliminary yet central activity in a career development program is the identification and analysis of target or end jobs. In this section, the literature on management skills is reviewed. Included in the review is a discussion of the research that has identified skills necessary to move from engineering or technical jobs to managerial positions. In the following section, predicting career success, techniques and measures for identifying candidates for development into target jobs are reviewed.

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There is an extensive literature dealing with the skills required for success as an executive or a manager. Some of this literature is based on empirical research (e.g., Albrook, 1968; Bray, Campbell, & Grant, 1974), but much of it is not. Lists of skills required for management tend to be long and general. In part, this is because the job of manager is very heterogeneous (Marshall & Stewart, 1981). Different skills are presumably necessary for different managerial jobs, and possibly for similar jobs in different organizations (Adams & Fyffe, 1969).

One of the best ways of isolating the skills necessary for management is to study the roles that are most common in managerial jobs. Lau and Pavett (1980) suggest that most managerial roles require skills in communication and in planning and directing the work of others. Rosen (1961), however, notes that the relative importance of various managerial roles and behaviors changes as one progresses through the different levels of management. By implication, different skills might be needed at different managerial levels.

Empirical studies of management support the need for interpersonal skills (Argyris, 1962; Bray, Campbell, & Grant, 1974; Wilkinson & Orth, 1986), leadership skills (Argyris, 1976), technical skills (Aranda, 1986), and administrative skills (Bray, Campbell, & Grant, 1974). The non-empirical literature has identified a much larger range of skills. For example, Glenn (1985) suggests that creativity and tolerance for ambiguity are critical determinants of managerial success. Green, Knippen, and Vincelette (1985) identified 20 critical skills, including planning, coaching, active listening, and problem solving. Skill lists that have no empirical basis tend to include a large number of socially desirable attributes that fit popular stereotypes of managers.

## From Engineering to Management

In most cases, engineers who wish to progress in the organizational hierarchy must move from a technical to a managerial job (Kosiba, 1985). Job shifts of this sort have long been discussed in the literature (e.g., Odiorne, 1956; Pearse, 1953), but the literature has rarely discussed the skills necessary to make this shift, or the best methods for developing those skills. Discussions of skills that are found tend to be general, often citing the need for interpersonal and administrative skills (Brinkloe, 1974; Stermole, 1984). The most specific recommendation is often that engineers must learn to understand financial reports, budgets, cost-control reports, and the like (Thompson & Murdick, 1986). There is more emphasis on personality characteristics and on characteristics of the situation that might facilitate this shift (Golson, 1985; Horibar, 1985). For example, Kolb (1984) notes that the shift from engineering to management requires an adaptive personality and learning style. Steiner and Farr (1986) cite the impact of the organization's reward system on such career moves.

Cross-cultural research provides valuable insights into the barriers that prevent movement from engineering to management. Researchers note that this type of career change is much easier in Europe (especially in Germany) than in Britain or the U.S. (Child, Fores, Glover, & Lawrence, 1983; Gerpott & Domsch, 1985). The reason for this is that professionalism among engineers and managers is less well developed in Europe. As a result, dual tracks are less likely to develop, and engineers feel less discomfort and encounter less resistance moving into management in Europe then in the U.S. One implication of this line of research is that engineers' difficulties in moving into management in the U.S. may reflect their orientation to the job rather than their lack of skills required for success as a manager.

## Summary

There is evidence that different skills may be needed at different managerial levels. In general, however, the list of skills required for management tend to be long and general. Personality and situation characteristics appear to play a role in a worker's successful shift from a technical to a managerial ladder.

## Predicting Career Success

Although there is a substantial body of literature demonstrating that psychological tests and assessments are effective in predicting managerial success, some cautions are in order. First, managerial jobs vary considerably in terms of knowledge, skills, and abilities thought to be needed for successful performance (Mumford, 1986). Thus, the validity of several predictors may be job-specific. Although research in validity generalization suggests that test validity does generalize across lower-level jobs in organizations, comparable analyses have not been carried out for managerial jobs. Second, Gerstein and Reisman (1983) note that several different predictors might be needed, depending on the business climate or the strategic direction of the organization. In general, higher-level jobs are more sensitive than lower-level jobs to factors of this sort.

Research on the prediction of managerial success has much in common with research on the prediction of non-managerial job performance. The most significant difference is a greater emphasis on personality and temperament and a lesser emphasis on cognitive and psychomotor ability in the managerial literature. While there are some studies relating scores on cognitive ability tests to managerial performance (e.g., Gruenfeld, 1960; Mahoney, Jerdee, & Nash, 1960), most of this literature is devoted to alternatives to ability tests.

In the 1950s and 60s, there was a substantial body of literature relating personality dimensions to managerial success (Grant, Katkovsky, & Bray, 1967; Mahoney, Jerdee, & Nash, 960; Miner & Culver, 1955; Myers, 1968; Neel & Dunn, 1960; Sands, 1963; Stogdill, 1948). One of the reasons that this line of research seems to have faded away was the inconsistency of findings in this area. Personality dimensions found to be important for success ranged from authoritarianism to fear of bodily illness, and very few dimensions found to be important in one study were replicated in another. Nevertheless, the assumption that personality is a critical determinant of success pervades the non-empirical literature on managerial performance, and there is evidence of renewed interest in personality variables among researchers (Brousseau, 1978).

Both interests (Butler & Bridges, 1978; Wagner, 1960) and values (Dickerson, 1987) have been shown to be related to success as a manager. In general, it is thought that these variables affect the manager's motivation to work, which in turn is related to performance. Background data have also been used to predict managerial performance (Appley & Irons, 1981; Wagner, 1960); the theoretical explanation for this link is less certain than for interests and values.

Interviews are a universal component of management selection, and there is evidence that they provide data that can be used to predict managerial performance (Bolt, 1983; Grant & Bray, 1969). A predictor that appears to be more widely accepted for managerial than for non-managerial selection is the peer nomination. Research has consistently verified the ability of a manager's peers to predict his or her success on the job (Dearborn & Simon, 1958; Edwards & Sproull, 1985; Tziner & Dolan, 1982a).

The assessment center represents the most successful method of predicting managerial performance (Bray, Campbell, & Grant, 1974; Bray & Grant, 1966; Thornton & Byham, 1982). The success of this technique has been demonstrated in the military as well as the private sector (Tziner & Dolan, 1982b). Questions have been raised about the construct validity of the assessment center (Sackett & Dreher, 1982, 1984), and about criterion contamination in assessment center research (Klimoski & Strickland, 1977). Nevertheless, assessment centers are widely regarded as valid, cost-effective, and fair (Burke & Frederick, 1986; Cascio & Ramos, 1986; Cascio & Silbey, 1979).

## Identifying High-potential Managers

The problem of predicting management potential is somewhat different from that of predicting performance in one's present job (Bray, Campbell, & Grant, 1974). Assessments of potential must necessarily be general, since the precise job that a person is being assessed for is often unknown at the time of assessment. Nevertheless, research on the assessment of potential is similar in many ways to research on predicting performance in the manager's present job. First, the assessment center represents the best predictor of management potential (Bray & Grant, 1966; Thornton & Byham, 1982). Furthermore, there is evidence that the assessment center measures potential independent of prior experience (Dulewicz & Fletcher, 1982). Components of the assessment center such as the interview and situational tests are thought to be especially useful in identifying high potential managers (Gill, 1979; Grant & Bray, 1969). Second, the use of multiple predictors and/or multiple assessors is advocated as a method of measuring potential (Edwards & Sproull, 1985). Assessment centers incorporate both of these features.

There are two distinct features of the literature on identifying high potential managers. First, it is believed by many (e.g., Gill, 1982) that intelligence is not a critical variable in distinguishing high potential candidates from others. Although it is not recognized as such, this finding may be the result of range restriction rather than a true reflecting of the importance of cognitive factors in management. That is, managers may be homogeneous with regard to intelligence. If this is true, cognitive tests cannot possibly discriminate high potential managers from others. Second, high potential managers may have special motivational needs (Ofner, 1987). Identifying a manager as a high potential candidate may create expectations regarding rapid promotions and extra development opportunities. Organizations that are unable to meet those expectations may stand to lose high potential manages. Loss of a small number of high potential candidates can have a substantial impact on the overall success of the human resource planning system (Murphy, 1986).

### Summary

Research on the prediction of managerial success indicates that interest measures, personality measures, ability and biodata have been found to predict success. However, the validity of such predictors may be job specific. Further, several different predictors might be needed depending on the business climate or direction of the organization. The assessment center also emerges from the literature as a useful method for assessing managerial potential.

## Skill Requirements for Jobs

In the previous two sections, the literature concerning methods for identifying and assessing individuals, abilities and potential was reviewed. In literatures on both human resource planning and career development, it is necessary to determine and identify the

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candidates most likely to succeed in target positions and to assess the skills they possess. Another component of an effective human resource planning system is the assessment of the skill requirements of jobs. It is important to know for career development and progression purposes how jobs overlap with each other in terms of requirements. Further, there is a problem of trying to forecast new tasks, jobs, and changes in technology that require the development of new skills or the upgrading of present ones. In this section, the literature on establishing skill requirements of jobs is reviewed. Further, techniques or approaches for linking skills with specific job tasks are presented.

The distinction between skills and abilities is relatively clear when discussing lower-level jobs. Here, skills are learned over a short period of time and are directed toward a special goal, whereas abilities are learned over a long period and are not directed toward any single goal. For example, typing is a skilled activity, whereas successfully comprehending the meaning of a magazine article reflects a basic verbal ability. In managerial jobs, the distinction between skills and abilities is not as clear (Fleishman, 1972; Thornton & Byham, 1982). Examples of managerial skills commonly encountered in the literature include decision making, planning, oral communication, and forecasting.

The human resource planning literature frequently mentions the need to inventory the skills available in the workforce and to compare those with the skills needed for key jobs (e.g., Benge, 1964; Bronstein, 1965; Hennessey, 1979). However, this literature provides very little detail on how skill levels of employees or skill requirements of jobs are determined. Presumably, the same methods that are used to predict managerial performance could be used to measure their present skill levels, although Sackett and Dreher (1982, 1984) note that the construct validity of the methods most commonly used to measure managerial skills is questionable. A more pressing problem is the determination of the skills required by different jobs in the organization.

The most common method of establishing skill requirements involves the use of expert judgment (Peterson & Bownas, 1982; Wexley, 1984). These judgments are often arbitrary, and may reflect stereotypes people hold about jobs rather than actual skill requirements. Research has shown that unstructured ad hoc judgments about the abilities and skills required by different jobs have little validity (Fleishman & Quaintance, 1984). However, research has also shown that the use of structured questionnaires with multiple experts to establish specific ability and skill requirements is feasible and can accurately identify relevant abilities (Dunnette, Hough, & Rosse, 1979). Furthermore, structured expert judgments have been used to successfully classify jobs in terms of their common ability requirements (Fleishman & Quaintance, 1984).

Several methods of job analysis involve or result in the assessment of skills and abilities required to perform a job. For example, the Minnesota Job Requirements Questionnaire asks supervisors to judge the extent to which each of nine cognitive and psychomotor abilities and skills is required to perform a job (Desmond & Weiss, 1973). Functional job analysis also requires supervisors or analysts to estimate ability and skill requirements (Olson, Fine, Myers, & Jennings, 1981).

Ability and skill requirements are sometimes derived from job analysis data, rather than asking supervisors or analysts to directly estimate those requirements. Sparrow, Patrick, Spurgeon, and Barwell (1982) discuss the use of the Position Analysis Questionnaire in deriving ability requirements. Cox (1983) discusses a similar application of task analysis.

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## Integrating Task and Skill Taxonomies

In principle, the best method of determining skill requirements would be to develop a list of tasks found in most jobs together with the abilities and skills required to perform those tasks. If this list was sufficiently comprehensive, it would be possible to determine the skill requirements of any job simply by knowing the tasks performed. This approach would require what Peterson and Bownas (1982) refer to as a job requirements matrix. A similar but less rigorous approach, referred to as the skills matrix, is described by Proske and LaBelle (1976). At a more macro-analytic level, Brousseau (1984) discusses similar concepts under the heading of job-person fit.

Although the desirability of developing job requirements matrices has long been recogn.zed (e.g., Dunnette, 1976), these matrices are difficult to develop. One reason for this is that task taxonomies and ability/skill taxonomies have been developed separately, and often have little in common (Dunnette, 1976, 1982). Peterson and Bownas (1982) describe research strategies that might be used to develop job requirement matrices.

Dunnette, Hough, and Rosse (1979) discuss several interesting applications of job requirement matrices. They illustrate both the use of structured expert judgment and task analysis in setting ability and skill requirements, and discuss applications of indices of job congruence in career planning. A congruence index is a measure of the percentage of overlap between the knowledge, skills, and abilities required in one job and those that are developed in other jobs in the organization. Transition between jobs that have high congruence indices is thought to be easier than between jobs that have low congruence indices.

If sufficiently detailed job requirements matrices should be developed, it would also be possible to develop job congruence matrices that measured the overlap, in terms of skills and abilities, of each job in the organization with all other jobs. A further generalization of this approach would be to develop a multivariate congruence matrix that measured the congruence of each job at a higher level in the organization with several combinations of jobs (e.g., those in the same career path) at lower levels. For example, a vice president of finance might have more congruence with a division manager who has held previous jobs in marketing than with one whose previous jobs were in production.

Schneider, Reichers, and Mitchell (1982) note that the skills and abilities required by jobs are correlated with the intrinsic rewards available in the job. Although their study used a non-managerial sample, it is possible that their results might apply here. That is, jobs that are congruent might also offer similar rewards.

### Summary

The most common method of establishing skill requirements involves the use of expert judgment. Sometimes ability and skill requirements are derived from job analysis data. Job requirements matrices can provide a method for determining the skills required in any job simply by knowing the tasks performed.

## Formal Training Issues

Once job requirements are determined and individuals are identified for development, the organization must consider what experience should be provided for the employee to develop key skills. The organization may utilize formal training methods to develop employees. A second approach is to identify jobs that would provide developmental

experiences for a candidate and rotate the employee through these jobs. In this section, research on employee skill development through formal training techniques is reviewed. In the following section, the development of skills through job transfer/job rotation and issues concerning job mobility are reviewed.

A distinction is sometimes made between management training and management education (Parry & Robinson, 1979). Training tends to be a shorter-term, more focussed activity that includes lectures, simulations, or modeling programs. A general description of how workers at all levels receive training is provided by Carey and Eck (1984). Pheysey (1972) surveyed managers' activities; the results of this survey provide a basis for designing the curriculum of general management training programs.

While most of the management training literatures has focussed on the development of skills, management training may also have other beneficial effects. Ferris and Urban (1984) note that management training is associated with reduced turnover among managers. One possibility is that training is seen as a form of recognition and investment in the individual manager, and that selection for training is therefore seen as a reward.

## Training Techniques

In addition to formal lectures, a wide variety of techniques are applied in training managers. The most frequently cited techniques involve behavioral modeling of critical skills and activities (Kraut, 1976; Latham & Saari, 1979; Manz & Sims, 1986; Robinson, 1980; Tosti, 1980; Wexley, 1984). Behavioral modeling combines theoretical and practical advantages; it is accepted by managers and training researchers alike as a useful method. Weiss (1977, 1978) reports related applications of social learning theory in management development.

Wexley (1984) discusses applications of simulations in training. Although more frequently encountered in training blue-collar workers, this technique has also been applied in training managers. Gliessman, Pugh, and Bielat (1979) report successful applications of concept-based training techniques. Finally, Hornstein and MacKenzie (1984) discuss methods that incorporate the techniques of organizational development in defining and developing managerial skills.

Although recent reviews have noted increased interest in management training, the theoretical basis for most management training efforts remains weak (Freedman & Stumpf, 1980). Training programs tend to be influenced more by fads than by research and the effectiveness of many training programs is doubtful.

Effective training programs incorporate two distinct components: development of internal cognitive models of the skills to be learned and mastery of the action components of those skills (King, 1965). In addition, the time frame of the training program must take into account the nature of the skills involved. Managerial training often involves complex, higher-order skills that might require long acquisition periods (Schneider, 1985).

## Transfer of Training

The most critical issue in both training and job rotation is whether skills learned in one setting (e.g., the classroom) will transfer to another (e.g., the job). Transfer problems are especially serious in situations where training involves learning general principles without the opportunity to practice them in settings that are similar to the job itself (Leifer & Newstrom, 1980).

Trainers in industry have shown considerable concern over the transfer of training. Marx (1982, 1986) presents a systematic model for transferring and maintaining skills that are developed with training. Spitzer (1982) reviews eight methods that are commonly used to facilitate transfer of training in industry.

Transfer of training is facilitated by early rewards for or success in using the skills that are acquired in training (Feldman, 1981). Transfer is most successful for skills that managers regard as important (Adams & Kiggins, 1976). One implication of this finding is that organizations should concentrate on convincing managers that the skills involved in their training programs are important. This is especially critical for training programs that are aimed at skills that are not used in the manager's present job. Another technique that facilitates transfer of training is goal-setting (Wexley & Baldwin, 1986). Both the use of assigned goals and participative goal setting have been shown to be effective. There is evidence that participative methods of training facilitate learning, and possibly transfer (Hogan, Hakel, & Decker, 1986). Finally, training managers in learning skills may facilitate the transfer of subsequent training (Dickhoff, 1982).

Fotheringhame (1984) cautions that transfer is substantially better for simple motor skills than for more complex cognitive ones. Anderson (1987), however, found that there is a positive transfer between skills when the skills involve the same "productions" or units of procedural knowledge. Anderson's findings concentrate more on cognitive skills rather than non-cognitive skills, including interpersonal and organizational. Therefore, careful attention must be given to the content of training when evaluating the likelihood of successful transfer.

An issue related to the transfer of training is the retention of skills that are learned but not practiced on the job. Research in this area has concentrated on the maintenance of motor skills (Adams, 1987). This research suggests that prior job experience is related to the maintenance of skills, in that skills are most easily learned and maintained if they build upon skills that have been practiced prior to learning (Spiker & Harper, 1985). The major finding to emerge from this literature is that procedural skills are forgotten quickly, but can be quickly re-learned, while continuous control skills are retained over long periods (Fleishman & Quaintance, 1984; Mengelkoch, Adams, & Gainer, 1971). Procedural skills represent those that are tied to a particular task (e.g., assembling a machine gun) (Schendel & Hagman (1982), whereas, control skills represent basic psycho-motor skills such as tracking a moving object. Schendel and Hagman (1982) suggest that trainees can reliably estimate the amount of refresher training needed to regain procedural skills.

One possible implication of the literature reviewed above is that basic skills are retained longer than task-specific skills, Waters (1980) distinguished between practice skills, insight skills, and context skills. Practice skills and insight skills are developed over short periods; the former are task-specific while the latter are not. Context skills are developed over a longer period. It is possible that practice skills are similar to procedural skills, while insight and context skills are similar to control skills in that the former are more easily forgotten than the latter. However, caution must be observed in generalizing from research on motor skills to managerial skills (Welford, 1980).

## Training vs. Experience

Management training tends to be oriented toward the development of highly specific job skills (e.g., how to use the new computer system) or interpersonal skills. Training more often involves lower-level than higher-level managers. Job rotation is favored over

training as a means of developing the general skills and knowledge that are thought to be necessary for success in top management. It is useful to note that human resource planning essentially incorporates the assumption that higher-level managerial skills will be acquired through a fairly extensive period of job rotation, or through carrying out highly varied projects and activities in a single job. Thus, training is not seen as a critical issue in the development of general managerial skills.

## Summary

The literature makes a distinction between training and education. Further, various training techniques appropriate for managers are identified. A critical issue in training is the transfer of training. Transfer is more likely for simple motor skills than for more complex cognitive; it is facilitated by early rewards for using those skills and by using those skills on-the-job. Although formal training is used with managers, it is not seen as a critical issue in the development of general managerial skills.

## Skill Development Through Job Transfers

The proposition that occupying a variety of jobs or carrying out a variety of critical assignments will develop the skills necessary for success at higher levels in the organization is absolutely central to human resource planning. This assumption is highly plausible, especially since there is research documenting the effects of work experiences on other stable characteristics of individuals. For example, work experiences have been shown to affect both intellectual and personality variables (Frese, 1982; Kohn & Schooler, 1978, 1881). In general, experience in complex, demanding jobs promotes intellectual flexibility and self-directness. Work experiences also affect values, particularly those associated with the intrinsic and extrinsic rewards of work (Mortimer & Lorence, 1979). Finally, work experiences affect perceptions of behavior-outcome linkages (Toffler, 1981) as well as performance-satisfaction linkages (Gould & Hawkins, 1978; Stumpf & Rabinowitz, 1981). Note that few of the studies cited here were carried out explicitly to test the effects of planned career moves on personality, values, or job perceptions. Nevertheless, they do provide support for the plausibility of the hypothesis that job assignments lead to changes in critical managerial skills.

Surprisingly, there is virtually no _empirical_ support for the hypothesis that job transfers facilitate the development of critical job skills (Brett, 1984; Brousseau, 1984; Pinder & Walter, 1984). It is not that studies have failed to uncover this phenomenon. Rather, there is virtually no empirical research that examines the hypothesis that job transfers lead to personal and/or role development (Brett, 1984).

The use of job rotation to prepare high potential managers for eventual top management positions involves a trade-off of short-term for long-term goals (Farnsworth, 1975; Steward, 1984). Critics note an over-emphasis on filling future needs without sufficient emphasis on the present needs of the organization (Mumford, 1986). Rotation of managers into new jobs can affect their own performance as well as employee productivity and morale (Dyer & Heyer, 1984). One implication of job rotation is that different criterion might be needed to evaluate a person who is placed in a job in order to develop certain skills than for someone who is in the same job because he or she already possesses the requisite skills. A person who is rotated among several different jobs might not perform them as well as a person who specializes in one type of job; the breadth of skills and abilities that are developed through job rotation are assumed to compensate for that performance differential.

## Psychological Effects of Job Rotation

While job rotation may contribute to the development of managerial skills, there is also the possibility that rotation will have negative effects on the psychological well-being of the manager (Brett, 1980). Presumably, job changes are stressful, and the cumulative effect of several job changes, even if they are all planned, could be negative.

To date, research has suggested that job mobility is not automatically stressful for the worker or his or her family, although there is some evidence that moving to a new location can be stressful for children (Brett, 1982). The effects of job changes are moderated by prior socialization and motivation, organizational socialization efforts, the nature of the new job requirements, and individual coping styles (Latack, 1984; Nicholson, 1984). The literature in this area is not sufficiently developed to allow one to specify a priori which types of job moves will or will not be stressful. On the whole, the literature suggests that the psychological consequences of planned job moves are more likely to be positive than negative (Keller & Holland, 1981).

## Job Mobility

Job mobility varies across career paths. Some paths have short transition times and high position ratios, whereas others present infrequent opportunities for lateral moves or promotions. Part of this variability is a function of the nature of the organization or the technology (Vardi & Hammer, 1977), and part is a function of the paths themselves. The most comprehensive models of career mobility (e.g., Vardi, 1980) also consider individual differences as well as economic and administrative variables.

The most significant determinant of mobility is the manager's early career success (Rosenbaum, 1979; Viega, 1983). Managers who perform well in their first few jobs or assignments show the greatest long-term career mobility. Of the 22 factors studied by Viega (1983), time in first position was the most consistent predictor of several measures of career success.

Plateauing is a common concern in research on career mobility. Bardwick (1986) notes that plateauing is inevitable for most managers, since the number of candidates far exceeds the number of positions that can possibly be filled in top management. In areas where the technology or business methods are changing rapidly, managers might experience job downgrading as well as plateauing (Hedaa & Joynt, 1981).

## Summary

In the absence of empirical research, we must depend on well-articulated theories of skill development to determine whether or not job transfers will lead to desired outcomes. Pinder and Walter (1984) present a comprehensive model that suggests that skill development will not automatically occur with new job assignments and that organizations must pay careful attention to a wide variety of intervening variables in order to guarantee that transfers will lead to any meaningful learning. This model suggests that the mere fact that a person has occupied a job, no matter how well the skill requirements of that job are understood, does not guarantee that the incumbent will develop relevant skills.

## Experiential Learning

Research on experiential learning suggests several boundary conditions exist that determine whether or not individuals will learn and acquire skills through experience.

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First, mere experience is not effective; learning often requires guidance, feedback, and an opportunity to practice (Lippitt, 1969). Second, learning is more effective if individuals have an opportunity to practice their skills in several different contexts soon after learning them (Knox, 1986). Third, learning varies according to the prior expertise of the learner, and experts do not always learn more quickly than novices (Lesgold, 1984).

Experiential learning involves practice of both general and specific skill components (Singley & Anderson, 1985). That is, learning is most effective when individuals have an opportunity to work on the basic skills that underlie performance as well as the specific skills needed to execute a particular task. Deck and Sebrecht's (1984) analysis suggests that experiential learning is an active process that involves decisions by the learner about what to learn and about the best strategy for learning particular skills.

Experiential learning often involves the re-formulation of action goals and plans (Frese & Stewart, 1984). One of the most difficult tasks in experiential learning is to learn new methods of achieving old goals, or new applications of old methods (Waern, 1985). Mastery of these tasks requires systematic training, and should not be left to unstructured experience alone. One issue that should be carefully examined is the prior experience of individuals who will be put into experiential learning situations. It is well known that the cognitive structures created by prior knowledge affect subsequent learning (Grotelueschen, 1979). Thus, two individuals with similar abilities but different backgrounds might learn very different things from the same experience.

Experiential learning is most effective when supplemented by more formal, structured methods, such as lectures, reading assignments, or demonstrations (Pirolli & Anderson, 1985). Modeling the behavior of others is often a component of experiential learning. Learning via modeling is most effective when the model is perceived to be competent and successful (Manz & Sims, 1981). Sims (1983) discusses applications of Kolb's Experiential Learning Theory that suggests the necessity of tailoring to individual learning styles. Freedman and Stumpf (1980), however, suggest that stable measures of individual differences in Kolb's set of learning styles do not exist and that applications of Kolb's theory are therefore invalid.

Transfer of training is a topic that is discussed extensively in the literature on structured training programs but is rarely discussed in research on experiential learning. Nevertheless, it is clear that the issue of transfer must be considered regardless of whether the material is learned in the classroom or through experience (Kaye, Stuen, & Monk, 1985).

## Adult Learning

Research on adult learning suggests some additional principles that can be applied to understand the process of experiential learning. First, there is clear evidence that adults, regardless of their age, can learn new skills (Thomas, 1985). Thus, there is no a priori barrier to adults' acquisition of skills and knowledge. Second, participative learning is more appropriate for adults than nonparticipative ones (Mehta, 1978). Thus, adults generally prefer experiential learning over classroom training.

Mezirow (1981) has classified the learning domain and notes that the ability to transfer one's perspective is a uniquely adult learning strategy. Therefore, while (as noted before) tasks that require new solutions to old problems or new applications of old procedures are very difficult, they generally are not beyond the capacity of the adult learner.

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## Summary

Research on experiential learning indicates that learning often requires guidance, feedback, and an opportunity to practice. Further, learning is more effective if an individual can practice skills in several contexts soon after learning them. There are individual differences in the effectiveness of experiential learning. Two individuals with similar abilities but different backgrounds might learn very different things from the same experience.

## Mastery Learning

The central idea in mastery learning is that there are two distinct states with regard to any given skill, mastery and nonmastery. If this idea is accepted, it becomes possible to classify people into discrete categories in terms of the skills they possess, and to similarly classify training interventions in terms of the skills that are mastered. Note that the use of two categories implies that the degree of mastery is not an issue; all of those in the master category are treated as equivalent. This assumption is most plausible if there is some clear minimum level of skill needed to perform some task and if increases in skill beyond this level have little effect on task performance. Research on mastery and its measurement is most often encountered under headings such as "criterion-referenced testing," "domain-referenced testing," and "competency testing."

The concept of mastery has had its greatest impact in educational settings (Glass, 1978). Here, attempts have been made to evaluate school children (and educational programs) in terms of the skills that are mastered rather than by comparing their test scores to scores of other students or to a normal curve. Examples of applications of mastery learning and related concepts in education are presented in Block (1971), Clark, Guskey, and Benninga (1983), and Dunkleberger and Knight (1979). These concepts have also been applied in management training (Lang & Dittrich, 1982) and human resource planning (Portwood, 1979).

The recurring problem in this area is the definition of mastery. The concepts of mastery vs. nonmastery are incompatible with research on human learning and skill learning and acquisition (Glass, 1978). Rather than there being two distinct states, it is likely that there is a substantial transition period between nonmastery and mastery (Bergan & Stone, 1985). As a result, technical efforts to define adequate criteria for mastery (e.g., Millman, 1973, 1974; Mills, 1983; Hambleton & Novick, 1973) have not been entirely successful. Glass (1978) has sharply attacked the concept of mastery and has shown that the boundary between mastery and nonmastery cannot be drawn without making arbitrary distinctions between what appears to be very similar levels of performance (i.e., performance near the boundary between nonmastery and mastery).

### Summary

The implication of literature on mastery learning can be summarized as follows: (1) there are degrees of mastery, (2) there are degrees of nonmastery, and (3) broad categories such as master and nonmastery are arbitrary and misleading. Thus, it is not possible to answer questions such as "How much time is needed to master skill X in billet Y?" unless one has defined a priori the meaning of mastery in that particular context. Even if such a definition can be derived without drawing arbitrary boundaries between masters and nonmasters, persons who have "mastered" a particular skill will nevertheless vary considerably in their actual skill levels.

# CONCLUSIONS

1. Human resource planning requires an integrated approach that involves coordinating several separate personnel systems. For example, if an organization wants to develop a technical ladder then the goals of the performance evaluation and promotion assessment system should be consistent with the development of such a ladder.

2. Critical activities in human resource planning include the identification of target jobs, identification of skills necessary to perform those jobs, and the assessment of current employees' skill levels.

3. Although there is a substantial body of literature describing career development activities, these descriptions tend to be vague. Further, links between career planning/management and other components of an effective human resource management system are not clear and are largely supported through anecdotal evidence rather than empirical evidence.

4. A technology does exist to develop career paths in organizations. Many organizations have developed dual career ladders to provide greater promotional and reward opportunities for technical workers. However, movement between the technical and managerial ladders tends to be less frequent as an employee moves up these ladders. Further, even when pay and benefits are equal, the dual career ladder system tends to formalize the less powerful position of the technical staff. One reason for this is that the other career ladder (management) generally has more status within the organization.

5. Empirical studies have found that successful managers need to possess interpersonal skills, leadership skills, technical skills, and administrative skills. One of the more promising methods of isolating skills is to study the most common managerial roles including communication, planning, and directing. There is some evidence that different skills may be needed at different managerial levels (Thornton & Byham, 1982).

6. Few skills facilitating a worker's shift from a technical to a managerial ladder have been successfully identified. Research in this area emphasizes personality and situation characteristics that might facilitate this shift including an adaptive personality and learning style and the organization's reward regarding such movement.

7. The literature on predicting career success is more job-specific than career-oriented; it identifies a large number of potential predictors. The assessment of managerial potential (e.g., high potential employees) is more general since the precise job that a person is being assessed for is often unknown. The assessment center emerges from the literature as a useful method for assessing potential.

8. In lower level jobs, the distinction between skills and abilities is relatively clear; however, this distinction is less clear as one moves up the organizational ladder. The most common method for establishing skill requirements of jobs involves the use of expert judgment. Sometimes ability and skills requirements are derived from job analysis data. Although difficult to develop, job requirements matrices can provide a method for determining the skills required in any job simply by knowing the tasks performed. Further, if sufficiently detailed, these matrices can measure the overlap of skills and abilities of each job in the organization with all other jobs.

9. Formal training involves shorter-term, more focussed activities including lectures, simulations, or modeling programs. Effective training programs incorporate (1)

the development of internal cognitive models of skills to be learned, (2) mastery of the action components of those skills, and (3) recognition that the time frame of the training program must take into account the nature of the skills involved (e.g., higher-order skills may require longer acquisition periods).

10.   Transfer of training is a critical issue in training.   Transfer of skills from one setting to another is facilitated by early rewards for using those skills and by using those skills on the job.   Transfer is more likely for simple motor skills than for more complex cognitive skills.   Further, basic skills are retained longer than task-specific skills.

11.   A critical issue in job rotation or job mobility is the transfer and development of skills in one job to another.   Although it is plausible that job assignments lead to changes in critical managerial skills, there is virtually no empirical support for this hypothesis. Further, job rotation involves a trade-off between short-term and long-term goals.

12.   The experiential learning literature identifies boundary conditions for successful learning.   The most critical condition is that individuals have an opportunity to practice and use their skills and preferably in several different contexts soon after learning them.

13.   One major problem in the area of mastery learning is the definition of mastery. Workers who have apparently mastered a skill may vary considerably in their actual skill levels.

14.   The literature does not provide clear direction for developing an integraded human resource system that would be compatible with concurrent multi-career development.

## RECOMMENDATIONS

1.   Organizations with multiple career paths should be identified and interviewed in order to determine how they manage such ladders.

2.   Other military services (e.g., Army and Air Force) should be interviewed in order to obtain information on the operational and technical development of their officers.

3.   Within the Navy specifically, an assessment should be made in the following areas:   (a) the current information on URL billets, (b) current strategic manpower planning for URL and URL MP officers, (c) current rotational practices for URL officers, and (d) the current training programs for skill and role acquisition for URL officers.

4.   Contingent on obtaining information from 1-3 above, develop a framework for identifying the parameters involved in effective concurrent multi-career management. Further, current Navy practices and systems should be integrated within such a model.

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